Final Biological Evaluation
For the Issuance of Permit DC0000019
Washington Aqueduct
EPA Region III
Under the Clean Water Act
April 18, 2008

A. Federal Action

1. General Background

The Federal action under consideration is the Environmental Protection Agency's (EPA) reissuance of the National Pollutant Discharge and Elimination (NPDES) permit for the Washington Aqueduct which is owned and operated by the Corps of Engineers. The existing permit was issued on March 14, 2003. A modified permit was issued on February 27, 2004. As is typical for NPDES permits, the term for the 2003 permit (including the 2004 modification) was five years with an expiration date of April 15, 2008. EPA has determined that the Corps has met the administrative requirements for an administrative extension of the existing permit; accordingly, the 2003 permit with its 2004 modifications will be in place until a final permit is reissued in 2008.

The National Marine Fisheries Service, is the federal agency with responsibility for the shortnose sturgeon (*Acipenser brevirostrum*) under the Endangered Species Act (ESA). It has advised EPA that the habitat at Little Falls is consistent with the preferred shortnose sturgeon spawning habitat. In an effort to protect that spawning habitat under the NPDES program, EPA has overseen two major water quality studies which suggest that, overall, the aluminum-bearing sediment discharges from the Aqueduct are not toxic to fish; however, if eggs or early life stages are present in the vicinity of the discharges during the Spring spawning season, the discharges may have a smothering effect upon them. As a result of these studies and other information available to the agency, in exercising its NPDES permitting authority for the Aqueduct, EPA has focused upon protecting the most sensitive life stages of aquatic species while looking for a long-term solution to reduce or remove the solids discharge from the Potomac River.

During the term of the 2003 permit the Corps has made considerable progress in identifying a long-term solution to remove the solids from the Potomac. Between December 2003 and September 2005, the Corps prepared an Environmental Impact Statement (EIS) that evaluated numerous residuals collection, conveyance, process and disposal alternatives. On October 28, 2005, the Corps issued a Record of Decision (ROD) which described the selected management alternative. On March 19, 2008, the Corps awarded a bid that will allow construction of the residuals project to begin in May of 2008.

2. The Federal Facility Compliance Agreement

At the time that the March 2003 permit was issued, EPA and the Corps entered into a Federal Facilities Compliance Agreement (FFCA). The FFCA is an expression of EPA's enforcement discretion, and it establishes a schedule to allow the Washington Aqueduct a reasonable amount of time to install treatment systems to comply with the NPDES permit. A 2007 amendment to the FFCA provided for an eleven month extension of the requirement to achieve full compliance with the numeric discharge limits at all the sedimentation basins no later than November 30, 2010, which will be in the term of the reissued permit. As noted, the FFCA is between EPA and the Corps, however, significant consultation with the United States Fish and Wildlife Services (FWS), National Marine Fisheries Service (NMFS) and other federal partners had taken place prior to its issuance and issuance of the NPDES permit. During the pendency of the FFCA and the 2003 permit and 2004 modification s, the federal partners, including but not limited to NMFS, US DOI, etc., have been contacted by the Corps during times of significant activity on the project. Prior to the 2007 modification of the FFCA, EPA and the Corps consulted with NMFS regarding the status of the project and reasons necessitating the eleven month extension of the FFCA.

3. Description of the Residuals Project

The residuals project includes a number of essential design elements which will be implemented at the Aqueduct, and includes the following:

a. Modifications to existing sedimentation basins at Dalecarlia to permit the installation of new continuous residuals collection equipment which is required to convey residuals to a central process facility.
b. Construction of three new residuals pumping facilities (the Georgetown Residuals Pump Station, the Dalecarlia Residuals Pump Station and the Forebay Residuals Pump Station) which are required to pump the collected residuals to a central processing facility.
c. Expansion of an existing booster control station at the north end of the Dalecarlia Reservoir to provided power for new forebay residuals dredging and pumping facilities.
d. Installation of several new underground liquid residuals conveyance pipelines.
e. Construction of a new central residuals processing facility.

In short, the purpose of the residuals project is to treat and then dispose of the process residuals rather than discharge them into the Potomac River. The Corps remains on schedule to complete this project on or before November 30, 2010.

B. Regulatory Background on the Proposed Permit

The Clean Water Act (CWA) requires that all facilities which discharge pollutants from a point source into the waters of the United States are required to obtain an NPDES permit. NPDES permits may either be issued by the EPA or by a state which has an EPA-approved

permitting program. In the instance of permits issued to facilities in the District of Columbia, EPA is the permitting authority.

A permit is typically a license for a facility to discharge a specified amount of a pollutant into a receiving water under certain conditions. The Washington Aqueduct, which provides drinking water for three wholesale customers, the District of Columbia and two areas in Virginia, currently operates under an NPDES permit that was issued on March 14, 2003. As a result of a formal consultation between EPA and the NMFS and US FWS a modification to the 2003 permit was issued on February 24, 2004. The 2003 permit and its 2004 modification has been administratively extended by EPA until such time as the 2008 permit is issued as final.

The administratively extended permit allows for the discharge of residual solids which result from the cleaning of the large sedimentation basins located at both Dalecarlia and Georgetown. The discharges may only occur during certain high flow conditions of the river and are prohibited during the spring spawning season of the shortnose sturgeon. The sediments are pumped into the Dalecarlia plant with the raw water that is used to make drinking water. Pumped raw water settles at the Dalecarlia Reservoir where approximately 51% of the solids are removed. From the reservoir, sediment containing process water is routed to either the Dalecarlia sedimentation basins or the Georgetown sedimentation basins where aluminum sulfate is added to enhance solids removal.

The intent of the draft 2008 permit is to continue the protections afforded by the administratively extended permit until completion of the residuals management facility in 2010. Because the residuals management facility will be completed during the pendency of this permit, the batch discharges from the sedimentation basins to the Potomac River will permanently be discontinued. Necessary protections for shortnose sturgeon and other living resources will remain in effect until the facility is on line, however once residuals handling facility is operational, no later than November 30, 2010, certain special conditions in the existing permit will no longer be needed.

C. Protections Established in the Issued 2003/modification 2004 NPDES Permit and the Administratively Extended Permit

The following is a summary of the principal requirements of the 2003 permit:

1. The 2003 permit required monitoring for chlorine in the discharge of the Dalecarlia sedimentation basins and treated water blow off through outfalls 002, 006 and 007 and established a no discharge limit for chlorine (equal to or no greater than 0.1 mg/l).
2. It established a prohibition of discharge from the sedimentation basins through outfalls 002, 003 and 004 during the spring spawning season which was defined as February 15 through June 15 each year. This was redefined in the 2004 modification as February 15 to June 30 of each year.
3. Established a technology-based effluent limit (30 mg/l average monthly and 60 mg/l daily

maximum) for total suspended solids (TSS) on outfalls 002, 003 and 004.

4. Established technology-based effluent limits for aluminum (4 mg/l average monthly and 8 mg/l daily maximum) on outfalls 002, 003 and 004. The technology-based limit was more stringent than the water-quality based limit which was calculated using a reasonable potential analysis. The more stringent technology-based limit was applied.
5. Using a combination of engineering and best management practices the permittee was required to increase the amount of incoming residual solids removed from the sedimentation basins by 85%.
6. Recording of surface, mid-depth and bottom water temperatures 24 hours in advance of an anticipated discharge during the shortnose sturgeon spawning season.
7. DMRs and notifications of anticipated or unanticipated bypass or upsets were to be sent to the Services in the event they occurred during the spring spawning season.
8. In consultation with the NMFS, the permittee was required to conduct a study to determine the extent shortnose sturgeon use the area in the vicinity of Little Falls for spawning. This was removed in the 2004 modification as this work was performed by other federal agencies.
9. In consultation with NMFS and EPA, the permittee was required to perform acute and chronic toxicity studies, including above and below each outfall. If 25% or more of any acute or chronic toxicity was demonstrated the permittee was required to prepare a Toxicity Identification Evaluation (TIE) for the discharge.
10. In consultation with EPA and NMFS the permittee was required to perform a study to determine the effect of solids on fish growth and spawning success. This was modified by the 2004 provisions.
11. The permittee was to perform a soil sampling study to characterize a swath of land on National Park Service property. This was removed in the 2004 modification as this work was preformed by the Department of the Interior.
12. In the event that it was necessary to remove certain rocks from the vicinity of outfall 002, the permittee would apply for a permit to do so.
13. The permittee was to perform ichthyplankton sampling immediately before, during and after a bypass/upset during the shortnose spawning season.
14. The permit specifically prohibits the discharge of floating solids and visible foam. The permits require the permittee to meet a pH level of not less than 6.0 standard units nor greater than 8.5 units.

D. Summary of Protections Established in the Issued 2004 NPDES Permit Modification

In addition to the modifications noted above in part C, the 2004 modification required the following:

1. Outfalls 008 and 009 were added. Outfalls 008 and 009 are outfalls to Mill Creek from the second and third high reservoirs from which discharges of potable drinking water are occasionally necessary for line maintenance.
2. Monitoring for perchlorate and for the Dalecarlia underdrain were added.

3. Terms and conditions and reasonable and prudent measures as required by the Incidental Take Statement accompanying NMFS' July 14, 2003 Biological Opinion were added.
4. Additional clarifying language relating to the bypass and upset conditions and when DMRs were to be sent to the receiving agencies were added.

E. Protections Established in the Draft April 4, 2008 Permit

1. The April 4, 2008 draft permit is intended to maintain established protections until the new residuals management facilities are in place. At that time, the solids in the sedimentation basins will receive treatment and will be disposed off site, rather than into the Potomac River. The Corps has advised that after the residuals management facilities are on line, certain waste streams including rain water, low volume wash waters or leakage may collect in the basins and need to be discharged on an occasional basis. Prior to discharge of those waste streams, the permit requires testing and notification to EPA and the District Department of the Environment (DDOE) that such discharge may occur. Waste streams will be required to meet the limits established in Part I prior to discharge.

2. The waste stream from the spring which underdrains the Dalecarlia sedimentation basin will continue to be monitored. Since the levels of perchlorate measured in this discharge are not sufficient to require treatment, monitoring shall continue so that in the event levels increase, this waste stream can be reevaluated for treatment.

3. All of the discharges were evaluated for conformance to new requirements associated with Total Maximum Daily Loads (TMDLs) promulgated and approved prior to issuance of the 2003 and 2003 permits. None of the TMDLs necessitated the imposition of new limits or controls.

4. New numeric limits for dissolved copper and dissolved iron have been placed on outfall 002.

5. New numeric effluent limits for dissolved copper, total aluminum and dissolved iron have been placed on outfall 003.

6. The requirement to remove the rocks in the vicinity of outfall 002 has been removed.

F. Results of the Toxicity Studies Performed Pursuant to the 2003/2004 Permit

The 2004 permit modification required the submission of a study plan to evaluate discharges from outfalls 002 and 003 for acute and chronic toxicity. Approval of the study plan was coordinated between NMFS, FWS and EPA. Under the study, the toxicity of the discharges and sediments to freshwater test species were quantified to determine whether the effluents have a reasonable potential to exceed applicable water quality standards and to ensure that the quality of the discharges does not change from historic data.

As required under Part III.D.1 of the permit the Aqueduct has submitted written reports describing the results of its yearly testing for the years 2004, 2005, 2006 and 2007. The results show that there is no instream toxicity for C. *dubia* or fathead minnows. Toxicity using H. *azteca* has consistently demonstrated some reduction in growth in the animals, however, this growth may be attributed to an inability of the animals to feed due to the low density "floc" layer that is formed at the bottom of the laboratory vessel which restricts to food particles. Overall the results of the toxicity testing using C. *dubia*, fathead minnows and the freshwater amphipod H. *azteca* are remarkably consistent with the results obtained in all the years, 2004, 2005, 2006 and 2007, as well as the earlier program conducted in 1999 - 2000.

The annual toxicity testing program also included the testing of Potomac River sediments from above and below outfalls 002 and 003. Using the freshwater amphipod (H. *azteca*) as the test organism, the results indicated no significant mortality in any of the four test treatments when compared to the control. Ten day survival percentages ranged from 99 - 100 percent in the four test samples, and 99 percent survival for the laboratory control sediment. The growth data showed no statistically significant difference between any of the four test treatments and the laboratory control.

G. The Scope and Results of the 2001 Water Quality Studies

The 2001 Water Quality Study was the basis for many of the conditions for the 2003/ 2004 modification and 2008 draft permit, and a summary of this work is submitted here as background for the water quality based requirements of the draft permit. The 2001 Study was a scientific study of the Aqueduct discharges which included the following six parts:

1. An effluent dilution and fate study, where a computer simulated river flow and the suspended solid's plume to determine acute and chronic dilution factors as a function of effluent loading and river flow. Plume mapping studies were conducted at Outfall 002 (Dalecarlia Basin) and Outfall 003 (Georgetown Reservoir). Plume mapping studies were not conducted at Outfall 004 because it discharges to the same portion of the Potomac River as Outfall 003 and because Outfall 004 drains Georgetown sedimentation basin number one which is a smaller sedimentation basin. Thus the discharge from Outfall 003 represents worst case in this location of the river.

   This portion of the study showed the following results:

   a. At Outfall 002, 22 percent of the total solids released passed beyond the downstream of the model during a 24-hour run. The resulting depositional footprint estimated using the SED2D model was 1 mm thick in the vicinity of Outfall 002, and decreased to approximately 0.02 mm downstream in the vicinity of Roosevelt Island.

   b. From Outfall 003, approximately 13 percent of the discharged solids passed

beyond the downstream end of the model during a 24 hour run. SED2D model indicated that the resulting depositional footprint typically exceeded 1 mm in the first 350 m, exceeded 0.2 mm for approximately 2,500 meters along the shallow near-shore region downstream, and decreased to approximately 0.05 mm in the vicinity of Roosevelt Island.

c. For Outfall 002, a chronic mixing zone dilution factor (at the permitted river flow of 153 cms) is calculated to be 51. Using EPA's 1 hour float time approach, the acute dilution factor is calculated to be 169 in this rapidly moving portion of the Potomac River. The complete mix dilution factor for Outfall 002 is 1,160.

d. At Outfall 003, the chronic mixing zone dilution factor is 4.3. The 1 hour average exposure approach used to determine the acute criterion results in a dilution factor of approximately 2.3. The complete mix dilution factor would be a factor of 136. This dilution factor could be increased (that is, improved) by modifications to the outfall, which are considered in the proposed permit.

e. The consultant for the Water Quality Study performed additional research regarding background levels of total suspended solids (TSS) in this portion of the Potomac River. Records of TSS (measured at Little Falls upstream of the Aqueduct outfalls) covering a period of almost 20 years (1980 to 1999) were reviewed. These records showed that the median (natural) suspended load in the Potomac River for this period was 218,000 kg/day. The May 25, 2000, discharge event from Dalecarlia Basin 3 (Outfall 002) released approximately 17,800 kg of solids. This value is exceeded on 90 percent of the days each year by the daily mass of solids in the Potomac River which pass Little Falls. The May 3, 2000, discharge event from the Georgetown Reservoir released an estimated 153,600 kg of solids. This solids loading from the Georgetown Reservoir is exceeded on 55 to 60 percent of the days each year by the daily mass of solids passing Little Falls. Translated, this means that the volume of sediment discharged from the basins is small in relation to the amount of background sediment in the Potomac River.

2. Effluent toxicity testing to determine the toxicity of discharges to freshwater species. Toxicity tests were conducted on three different fractions of the Aqueduct effluent: whole effluent samples (for the acute toxicity tests), supernatant from the settled whole effluent (for the chronic toxicity tests) and the settled solids of the whole effluent (for the benthic tests).

This portion of the study showed the following results:

a. The acute test results indicate that (with one exception) the whole effluent samples collected for the preliminary testing and for Rounds #1 through #4 were not acutely toxic to the test organisms. The 48- and 96-hour LC50 values were >100

percent effluent (TUa <1.0) for the waterflea (*D. Magna*), the fathead minnow (*P. Promelas*) and the striped bass (*M. Saxatilis*). One fathead minnow test showed some level of dose-related acute toxicity which resulted in a 96-hour LC50 value of 29.3 percent effluent.

b. The chronic toxicity test results showed that in two of the four rounds, the effluent was not chronically toxic. In the other two rounds, the lowest 7-day chronic value (ChV) for a fish or invertebrate was 35.4 percent effluent. Similarly, the Dynamac study concluded "that the effluent released from the sampled sedimentation basins had no effect on either morality or growth of fathead minnows."

c. For the benthic testing, the 10-day values (based on survival) from the four rounds of testing were>100 percent sample, but the effluent concentration causing a reduction in growth (the IC25 value) ranged from 6.9 to 32.8 percent effluent.

It should be noted that for the laboratory tests, test organisms were continuously exposed in the laboratory for a period of 2 - 10 days (depending upon the test) while actual water column exposure in the Potomac is transient, lasting approximately 4 - 8 hours. In practical terms this means that the above results are very conservative.

The Water Quality Studies state that the bulk of the suspended solids settle out of the discharge within a short distance of the outfall. In a point of clarification, sand, because of its particle size, density, and the fact that it is the prevalent constituent of the sediments, is the predominant material which settles out near field of the outfalls. Sand is an inert material which does not adsorb pollutants or contaminants. This means that the material that settles out in the vicinity of the outfalls retains the least amount of aluminum or other materials. Although the studies did not investigate how long the footprint remains in the study area, EPA believes that due to the large volume of river flow, scouring storms and snow melt, the deposited material does not remain in the area for an extended period of time. This may also be inferred by the benthic study information contained in both the Dynamac and Water Quality Studies. In the Dynamac study (study area upstream of the Aqueduct outfalls), researchers were not able to resample locations due to the shifting of river sediments. In the Water Quality Study, the benthic studies were inconclusive in large part due to fouling of the Hester-Dendy plates by the large volume of background river solids.

Although the cumulative effects of the discharges is not directly addressed in the Water Quality Study, the pattern of Aqueduct releases and the results of the study lend no evidence to support a cumulative effect. There is an approximate 3 mile distance between the Dalecarlia and the Georgetown basins, so distance between discharges is one factor. In addition, it is common practice of the Corps to schedule basin cleanings one week apart, although there have been infrequent occasions where due to river levels it has been necessary to have back-to-back cleanings (i.e., two basins within 48 hours). As can be seen on the attached chart, *Basin Washing*

Dates, no discharges have occurred during the spring spawning season since the issuance of the March 14, 2003 permit. .

The principle factor in determining when individual sedimentation basins are to be cleaned is the amount of solid volume buildup in each basin. As storage volume is a factor in the production of safe drinking water, it is the Corps practice never to have more than two basins simultaneously out of service. As discussed above, there is no reason to believe that sediments, or alum, reside at either outfall for a lengthy period of time. Lastly, even if there were a cumulative effect, the draft permit, with its prohibition on discharges during spawning season would effectively ban sediment releases during the most critical life stage of all fish species. Until the residuals management facility is on line, under certain emergency circumstances, as expressed in Part II.B.3 and 4, which are carried over from the 2003 permit, the basins may be discharged during the spawning season. This is an emergency provision to protect the drinking water source for the District of Columbia and has not been invoked since 2003 permit went into effect (please refer to *Basin Washing Dates* attached). This provision expires on November 10, 2010.

3. Effluent chemical characterization, using existing effluent discharge data to calculate preliminary projections of receiving water concentrations in comparison to water quality criteria.

   The results show that total aluminum concentrations for the Dalecarlia and Georgetown basins averaged 2,273 and 1,510 mg/L, respectively, for the period 1997 to 2001. EA Engineering's data included both total and dissolved aluminum, and indicated that the percentage of dissolved aluminum is considerably less than one percent of the total aluminum value in the effluent samples. Although total aluminum concentrations are high, effluent toxicity testing indicates that the aluminum in the effluent samples is not highly bioavailable or toxic.

4. An analysis of the Potomac's fishery to determine the effect of the discharge upon key anadromous and resident fish species. The Study Plan for the Washington Aqueduct Water Qualities Study specified that "species of importance" were to be identified for the water qualities studies. Resource agencies including the United States Fish and Wildlife Service, National Marine Fisheries Service, DC Fish and Wildlife, and the Maryland Department of Natural Resources were consulted to derive the list of locally important species. This list included both anadromous and resident species of commercial and recreational value that are known to inhabit the Potomac River in the general vicinity of Washington, DC for at least part of their life cycle. Species of interest included the following:

Anadromous Species	Resident Species
Striped bass (Morone saxatilis)	Yellow perch (perca flavescens)
White perch (Morone americana)	Smallmouth bass (Micropterus dolomieu)

American shad (Alosa sapidissima)
Blueback herring (Alosa aestivalis)
Alewife (Alosa pseudoharengus)
Shortnose sturgeon (Acipenser brevirostrum)
Sunfish species (Lepomis spp.)
Channel catfish (Icalurus punctatus)
Brown bullhead (Ictalurus nebulosus)

Life history information for each species identified by the Study Plan was presented followed by a discussion of the potential effects of Aqueduct discharges on the fish community.

The report indicated that the potential impacts to the fishery would be primarily restricted to young life stages of some of the fish species of concern. Juvenile and adult fish would be expected to avoid the discharges if stressed. Larvae, and particularly eggs, however, would be less able to avoid the sediment plume in the discharge areas.

Risks to young life stages of fish from the discharge would be from suspended solids (either in the water column or deposited on the substrate) and elevated aluminum concentrations. Studies from this water quality program indicate that a substantial quantity of solids falls to the substrate within a reasonably small area near the discharge (primarily from Outfall 003) and there could be moderate risk to several fish species of concern from sediment discharges when these young life stages are present. The primary risk would be from deposition of suspended solids onto eggs and larvae (causing smothering and reduced oxygen levels) which could affect survival. However, the area potentially affected represents a small portion of the Aqueduct study area.

5. An analysis of the Potomac's macroinvertebrate community to characterize the community prior to and after discharge.

The results of this portion of the study are as follows:

a. The substrate in the study area consists of boulders, bedrock and mud. Large bedrock formations were evident along the shoreline and also in mid-river where they are above the water surface during low tide. The softer sediments are in patches between or on these rock substrate areas. Sediments are continually redistributed following medium to high river flow events.

b. A large load of sediment naturally moves through this segment of the Potomac during periods of increased flows, and deposits in the wider, slower current velocity segments of the river. This large amount of sediment compromised some of the tests.

c. The benthic community consisted of tolerant species which, according to the report, is a consequence of the rigorous conditions to which they are exposed. A large amount of natural sediment load is transported through this area and the

benthic community has adapted to this.

Based upon this and other observations during the study, EA has concluded that the Aqueduct discharge does not have a substantial or cumulative impact upon the tolerant benthic community present in this reach of the Potomac River.

6. An analysis of a modification of the aluminum criteria in the event the other parts of the Aqueduct Study show that this would be desirable. This portion of the study has not been authorized because the other parts of the Aqueduct Study did not indicate that modification was desirable.

H. Results of Additional Modeling Runs

In addition to the above Water Quality Studies, at EPA's request EA ran computer model studies of Washington Aqueduct Outfalls 002, 003 and 004. (As noted above, Outfall 002 drains all of the Dalecarlia sedimentation basins, Outfall 003 drains Georgetown sedimentation basin number 2 and Outfall 004 drains Georgetown sedimentation basin number 1). Each of the outfalls was modeled at the following river flow conditions:

- 3,490 mgd river flow, ebb tide, 3 hour clean out(Outfall 004 only)(this is the river flow specified in the current NPDES permit);
- 2,500 mgd river flow, ebb tide, 3-hour clean out(Outfalls 002 and 003);
- 1,500 mgd river flow, ebb tide, 3-hour clean out (Outfalls 002 and 003);
- 800 mgd river flow, ebb tide, 3-hour clean out (Outfalls 002 and 003).

The analysis that resulted shows that the sediments could be discharged from Outfall 002 at a river flow as low as 800 mgd with no adverse toxicological effect (either chronic or acute), and the sediments could be discharged from outfalls 003 and 004 at a river flow of 1,500 mgd with no adverse toxicological effect (either chronic or acute).

Additional computer generated studies showed that the District of Columbia Water Quality Standard would not be exceeded at the 800 mgd flow rate for Dalecarlia or 1,500 mgd flow for the Georgetown sedimentation basins.

I. The Study Area

The study area for the Washington Aqueduct Water Quality Studies includes an 8.0 km stretch of the Potomac River just above the Little Falls Pumping Station in Maryland south past Theodore Roosevelt Island to the Arlington Memorial Bridge.

J. List of Federally Identified Species Within the Study Area

The following federally endangered or threatened species have been identified by the

Services as inhabiting or having the potential to be located within the study area and thus subject or potentially subject to this NPDES permitting action:

1) Shortnose Sturgeon (*Acipenser brevirostrum*) - The shortnose sturgeon was originally listed as endangered by the US FWS in 1067 under the Endangered Species Preservation Act (32 FR 4001, Appendix I). The NMFS later assumed jurisdiction for the shortnose sturgeon under a 1974 government reorganization plan (38 FR 41370).

Shortnose sturgeon historically occurred in most large river systems along the east coast of North America. However, the species is not considered to be rare to absent from many of the rivers of its former range, including the Potomac River. In the past ten years, surveys for shortnose sturgeon within the Potomac River have found very few fish. One adult specimen was collected at the mouth of Potomac Creek in 1996 and another taken near the mouth of the St. Mary's River in 1998. A US Army Corps of Engineers sponsored netting study which took place in the late 1990's to 2000, which surveyed the Potomac River from the Chesapeake Bay to Little Falls, failed to catch any shortnose surgeon.

In a new Potomac River shortnose sturgeon netting study initiated in 2004 by the National Park Service, the US Geological Survey and the US FWS, one adult shortnose sturgeon with fully developed eggs was captured in September of 2005 just above Indian Head, Maryland, off Craney Island (Kynard et al. 2007). This fish was fitted with a radio transmitter and its movements were tracked every seven to ten days. The female sturgeon is believed to have remained in the general area of its capture until late March or early April of 2006, at which time it moved up the Potomac River. On April 10, 2006, the egg-laden female arrived at Chain Bridge below Little Falls. The Services believe that the habitat at Little Falls (which is on the northwestern border of Maryland and the District) is consistent with the preferred shortnose sturgeon spawning habitat in other river systems. This habitat includes coarse grain sediment, appropriate flow conditions and fresh water. In addition, shortnose sturgeon usually spawn at the uppermost point of migration within a river, which in the Potomac is probably Little Falls. The study team attempted, but was unable to net spawned eggs. No male sturgeon were caught in the spawning area. After seven days the female returned downriver, and by May was located in the vicinity of Port Tobacco Maryland. More information on the suitability of this habitat is available in the Kynard report referenced above.

A second egg-bearing female shortnose sturgeon was captured and fitted with a transmitter in April of 2006 in Pope Creek. This fish did not move upriver. Both tagged females are believed to have remained in the area between Quantico Marine Base and Indian Head.

Shortnose sturgeon were addressed in the Water Qualities Studies in that their habitat requirements, distribution and spawning information are discussed (see Chapter 5). As the shortnose sturgeon is endangered, it is not suitable for testing so no direct conclusions can be drawn regarding the toxicity of the discharges. EPA continues to believe that the threat to the shortnose sturgeon is the potential for smothering of eggs or larvae which may be in the vicinity

of the Aqueduct's outfalls at the time of a discharge. EPA has written conditions into the permit which prohibit these discharges, except under narrowly prescribed emergency conditions. The intent of the permit is to protect early lifestages of shortnose sturgeon and other anadromous and resident species in this stretch of the Potomac River.

K. Other Federally Identified Species of Potential Concern in the Potomac River Basin

Although the following species may be generally in other areas of the Potomac Basin, EPA and FWS have determined for the reasons stated below that the Bald Eagle and Dwarf Wedge Mussel do not occur in the study area. Therefore no further consultation is necessary with respect to these species:

1. The Bald Eagle (*Haliaeetus leucocephalus*) - The bald eagle has the potential to be found at many locations along the shoreline of the Potomac River. Due to the increase in the numbers over the years, the bald eagle is under consideration for delisting from the list of endangered and/or threatened species. Based on a revised recovery plan, which was prepared for the species in 1990, it was listed as endangered and, therefore, will be evaluated in this biological evaluation. Please check with FWS for updated status but I believe in July 2007 the Bald Eagle was removed from the ESA list.

The bald eagle's primary foraging habitat are bays, supplemented by other more aquatic areas along the shorelines of rivers and lakes or perched in the trees bordering such rivers. In addition it may be found in freshwater marshes on hillocks, muskrat houses, bare sand or mud bars and isolated trees. There is well documented evidence to support its role as predator, scavenger and pirate, exploiting a variety of food sources such as birds, mammals, fish (consisting primarily of menhaden, large gizzard shad, white perch and catfish) and waterfowl depending upon food abundance. This role increases the primary and secondary susceptibility of the bald eagle populations to pesticides, toxic substances and other sources of potentially lethal pollutant contaminants.

The bald eagle may occur on an occasional or transient basis at almost any location along the Potomac River, and thus an individual could be present, albeit unpredictably and infrequently, within the study area. However, no concentration areas or nests are present within the study area. The nearest nests occur eight miles upstream of the upstream end of the area and three miles downstream of the downstream end of the area. Results of the water quality study for Aqueduct support the conclusion that Aqueduct discharges are unlikely to affect these nesting eagles or their productivity. The pollutants of concern in the discharge are suspended solids and aluminum. Results of the effluent fate and transport modeling indicate that detectable changes in water quality parameters for these pollutants do not appear to extend much beyond the Theodore Roosevelt Bridge. The closest bald eagle nest is more than three miles downstream from this area. Since nesting bald eagles generally forage with one mile of their nests, it is therefore unlikely, that eagles would be foraging in the plume-impacted area. In addition, the Aqueduct's discharges are intermittent, further reducing the likelihood of exposure of foraging bald eagles to

the effluent. Indirect effects due to contamination of upstream food sources also appear unlikely, as aluminum is not a contaminant that biomagnifies in the food chain.

2. The Dwarf Wedge Mussel - Within the Potomac River Basin, the dwarf wedge mussel populations are known to be extant in only three small Potomac River tributaries –the Aquia Creek in Virginia and the Nanjemoy Creek and MacIntosh Run, both in Maryland. The confluences of these rivers are approximately 40, 50 and 80 miles, respectively, downstream of the southernmost Washington Aqueduct discharge. From these confluences, the precise location of the populations is a considerable distance upstream along each tributary (at least 11 additional miles upstream on Aquia Creek, 9 miles on Nanjemoy Creek and 8 miles on MacIntosh Run).

For the District of Columbia, two historical records exist (1887 and 1892) for the dwarf wedge mussel. Over the past decade since the dwarf wedge mussel was listed as endangered, extensive searches of the non-tidal Potomac River and the C and O Canal, both in Maryland and the District of Columbia, and the Potomac tributaries in Virginia have been conducted by a variety of groups. Other than the populations described above, no additional dwarf wedge mussel specimens have been found within the Potomac drainage. The best scientific evidence indicates that dwarf wedge mussels do not occur in tidal waters and there are no recent records for the dwarf wedge mussels in the mainstem Potomac above the head of tide.

Habitat requirements for the dwarf wedge mussels include high gradient, soft water, non-tidal habitat. It lives on muddy sand, sand and gravel bottoms in creeks and rivers of varying sizes, in areas of slow to moderate current and little silt deposition.

L. Manner in Which The Draft Permit May Affect Listed Species

On July 15, 2003, NMFS issued an biological opinion (BO) for the 2003 permit and Federal Facilities Compliance Agreement. Sections C and D of this biological evaluation discuss the requirements of the 2003 permit and its 2004 modification which resulted from the formal consultation in 2003. This section discusses the requirements of the 2008 draft permit and how it affects shortnose sturgeon. Overall, each requirement is more restrictive than those of the 2003/2004 permit because the permit and FFCA require the discontinuation of batch discharges by November 30, 2010.

1. The 2008 permit requires the continuation of the acute and chronic toxicity studies, including above and below each outfall until completion of the residuals processing facilities. If unacceptable toxicity is conformed a confirmatory test (Toxicity Identification Evaluation (TIE)) is required. This test is required on four discharges per calendar year and is intended to identify toxicological effects on living resources, including shortnose sturgeon, which may result from the discharge.

2. The requirement to evaluate the effect of solids on embryo-larval fish in the event of any batch discharges from the sedimentation basins during the spring spawning season is

continued in the permit until November 30, 2010, at which time the batch discharges are prohibited. This requirement is more restrictive than that in the 2003/2004 permit as all batch discharges will be discontinued.

3. The requirement to perform ichthyplankton sampling immediately before, during and after a bypass/upset during the shortnose spawning season is continued until November 30, 2010.

4. The Corps has advised that after the residuals management facilities are on line, certain waste streams including rain water, low volume wash waters or leakage may collect in the basins and need to be discharged on an occasional basis. Prior to discharge of those waste streams, the permit requires testing and notification to EPA and the District Department of the Environment (DDOE) that such discharge may occur. Waste streams will be required to meet the limits established in Part I prior to discharge. Further, these discharges are anticipated to be low volume discharges to a large volume of river water, thus their overall affect is expected to be negligible. Never-the-less, the testing and notification requirements are intended to provide strict limitations on the discharge in accordance with established technology or water quality-based requirements and are intended to meet the District's water quality standards. Water quality standards are protective of the designated use which for the Potomac River, includes but is not limited to, the protection and propagation of fish, shellfish and wildlife.

5. The waste stream from the spring which underdrains the Dalecarlia sedimentation basin will continue to be monitored. Since the levels of perchlorate measured in this discharge are not sufficient to require treatment, monitoring shall continue so that in the event levels increase, this waste stream can be reevaluated for treatment. This requirement is intended to be protective of the District's narrative water quality standards in that it provides information relating to the levels of pollutants in this discharge which can be acted on in the event they increase to an actionable level.

6. New numeric limits for dissolved iron have been placed on outfalls 002 and 003. These new limits are based on the potential to exceed the District's water quality standards and are believed to be protective of the intended use of the Potomac River. The batch discharges containing this metal is subject to the prohibition to discharge during the spring spawning season and will be discontinued after November 30, 2010, with the except of the low volume, low concentration, controlled discharges subject to continuing testing and numeric limitations. As these new limits are more stringent than the protections afforded in the administratively extended permit, EPA believes these restrictions are more protective of shortnose sturgeon.

7. New numeric effluent limits for dissolved copper, total aluminum and dissolved iron have been placed on outfall 003. These new limits are based on the potential to exceed the District's water quality standards and are believed to be protective of the intended use of

the Potomac River. The batch discharges containing this metal is subject to the prohibition to discharge during the spring spawning season and will be discontinued after November 30, 2010, with the except of the low volume, low concentration, controlled discharges subject to continuing testing and numeric limitations. As these new limits are more stringent than protections afforded by the administratively extended permit, EPA believes these restrictions are more protective of shortnose sturgeon.

8. The 2008 draft permit contains controls divided into three areas: 1) technology-based controls, 2) water quality based controls, and 3) management of the sediment discharges.

   a. The technology-based portion of the draft permit allows credit to the Washington Aqueduct for the approximately 51% of solids it currently removes from the incoming raw water. These solids settle out of the water in the Dalecarlia Reservoir and are subsequently dredged and land applied offsite. They are never returned to the Potomac.

   b. The water quality-based controls recognize the results of the two scientific studies (Dynamac, 1993 and EA, 2001) which demonstrate that the sediment discharges have a negligible affect upon the Potomac River; and toxicological testing required by the 2003 issued permit. The permit allows the permittee to release the aqueous and the sediment portions of the discharge at lower river flows, in order to provide the ability to meet the prohibition on discharge during the spawning season.

   c. In recognition of the potential sensitivity of the early lifestages of fin fish to these sediment discharges, this draft permit provides for the strict management of the sediment releases to the Potomac River. These management controls include, but are not limited to, the prohibition of discharge during the spawning season (except as noted below) and for the Georgetown basins, an increased solids release time and doubling of the amount of raw river water used to flush the basins.

   d. The administratively extended permit and the draft 2008 permit allow for the discharge of the sedimentation basins during the spring spawning season under emergency conditions until November 30, 2010. The requirements covering emergency conditions are contained at Part II.B.3 and 4 and Part III Special Conditions. All existing protections are carried over until November 30, 2010. On that date, the large batch discharges from the sedimentation basins will cease so the emergency provisions and prohibition against discharge during the spring spawning season will no longer apply.

M. Long-term Goal for Sediment Management

Reducing the sediment discharges from the Washington Aqueduct are part of a much

larger sediment load problem in the Potomac River and Chesapeake Bay and must be viewed in that context. One must consider that the discharged sediments (except for the alum which is added as a flocculent), are not contaminants or pollutants that are added by the permittee as part of the water treatment process, rather, they are pumped into the plant with the raw Potomac River water that is treated to become drinking water. This means that controlling the amount of sediment load upstream of the Aqueduct's intakes will have an effect upon the amount of sediment that is discharged back into the Potomac. Controlling upstream sources of contaminants, including TSS and metals, is a mandate for several large environmental programs including EPA's Total Maximum Daily Load program; the Chesapeake Bay Agreements; tributary strategies undertaken by the states of Maryland, Virginia, West Virginia and Pennsylvania; improvements in river water quality which result from the implementation of upstream municipal separate storm sewer (MS4) permits; and stream bank restoration projects which are underway by environmental organizations such as the Potomac Conservancy and the Maryland Department of Natural Resources.

Other opportunities for sediment control are offered by EPA's wet weather control programs, most notably the National Combined Sewer Overflow (CSO) Control Strategy. The CSO Strategy requires that municipalities, including the District of Columbia, and large municipalities upstream of the District, prepare and implement Long Term Control Plans (LTCP). EPA has issued an NPDES permit to the District of Columbia Water and Sewer Authority (WASA) which incorporates the District's LTCP requirements into the Blue Plains permit. In addition, EPA is working with WASA on the implementation of improvements at Blue Plains which will significantly reduce the levels of total nitrogen by 2014 and other wet weather pollutants by 2018.

N. Summary Determination

The focus of this draft permit is to continue the protections to shortnose sturgeon and the Potomac River afforded by the 2003 permit and its 2004 modifications and the FFCA. Significant progress has been made in the design of the final remediation and it is anticipated that ground will be broken for the construction of the facility in May of 2008, with construction completed by November 30, 2010.

As noted at Section G.2 above, the draft permit retains the 2003 prohibition on discharges during spawning season. This effectively bans sediment releases during the most critical life stage of all fish species. It is true that under certain emergency circumstances (intended to protect the drinking water source for the District of Columbia) the Corps is authorized to discharge during the spawning season. Since the imposition of this limitation in the March 27, 2003 permit, no discharge has occurred during spawning season. A new residuals management facility will be completed by November 30, 2010 upon which date only managed incidental discharges attributed to wet weather accumulations will occur.

Until November 30, 2010, if a batch discharge were to occur during the spring spawning

season, a take of shortnose sturgeon could occur, however, each of the protections afforded since 2004 would be inplace. The likelihood of a take is eliminated on November 30, 2010 as the residuals processing facility is brought on line.

All scientific studies performed to date show that the conditions contained in these permits are protective of the aquatic species and their habitat and District of Columbia Water Quality Standards. Therefore, it is EPA's opinion that the public notice and ultimate issuance of this draft permit is not likely to adversely affect the listed species. On the contrary, issuance of this permit is part of the continuing process to significantly reduce or eliminate these discharges from the Potomac River.

EPA offered the draft permit for a 30 public comment period which commenced on April 4, 2008 and ends May 7, 2008. The purpose of the public comment period is to solicit comments from interested citizens or groups which EPA will consider prior to issuing a final NPDES permit.

Basin Washing Dates

From: January, 2003 Dalecarlia		To: January, 2008 Georgetown	
2003			
1/7/2003	Dalecarlia #4	7/29/2003	Georgetown #2
1/13/2003	Dalecarlia #3	11/17/2003	Georgetown #2
2/4/2003	Dalecarlia #1		
2/24/2003	Dalecarlia #2		
2/21/2003	Dalecarlia #4		
2/26/2003	Dalecarlia #3		
7/1/2003	Dalecarlia #1		
7/7/2003	Dalecarlia #3		
7/14/2003	Dalecarlia #4		
7/21/2003	Dalecarlia #2		
10/10/2003	Dalecarlia #1		
10/15/2003	Dalecarlia #2		
10/21/2003	Dalecarlia #3		
10/27/2003	Dalecarlia #4		
2004			
1/13/2004	Dalecarlia #1	1/15/2004	Georgetown #2
1/14/2004	Dalecarlia #2	7/21/2004	Georgetown #1
1/20/2004	Dalecarlia #3	8/11/2004	Georgetown #2
2/8/2004	Dalecarlia #4	12/4/2004	Georgetown #1
7/14/2004	Dalecarlia #1		
7/20/2004	Dalecarlia #2		
7/25/2004	Dalecarlia #3		
8/2/2004	Dalecarlia #4		
8/9/2004	Dalecarlia #3		
10/27/2004	Dalecarlia #1		
11/13/2004	Dalecarlia #1		
11/14/2004	Dalecarlia #2		
11/20/2004	Dalecarlia #3		
11/30/2004	Dalecarlia #4		
2005			
1/3/2005	Dalecarlia #3	1/31/2005	Georgetown #2
1/18/2005	Dalecarlia #2	7/12/2005	Georgetown #1
1/26/2005	Dalecarlia #1	10/31/2005	Georgetown #2
1/31/2005	Dalecarlia #4	11/28/2005	Georgetown #1
2/7/2005	Dalecarlia #3		
7/4/2005	Dalecarlia #3		
7/10/2005	Dalecarlia #1		
7/12/2005	Dalecarlia #2		
7/18/2005	Dalecarlia #4		
10/17/2005	Dalecarlia #3		
10/24/2005	Dalecarlia #1		
10/31/2005	Dalecarlia #2		